UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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REPLY TO: 3420

DATE: MAR 24 1987

SUBJECT: Evaluation of Prescribed Burning on Gold Note Ridge Fuelbreak Amador Ranger District (Report No. 87-5)

TO: Forest Supervisor, Eldorado National Forest

Stewart Craig, Silviculturist on the Amador Ranger District requested an evaluation of a western pine beetle infestation in an area in the Gold Note Ridge fuelbreak which had previously been treated by prescribed underburning. This area and an adjacent plantation were being considered for additional treatment by prescribed underburning during March, 1987. The fuelbreak and adjacent plantation were examined on February 26, 1987 by Dave Schultz, entomologist, James Allison, pathologist, and Stewart Craig.

Extensive areas along Gold Note Ridge have received various treatments to produce a fuelbreak. The area of concern is located at T. 8 N., R. 13 E., S. 11. This 250 acre parcel is a Dunning Site 1A and is occupied almost entirely by 50 to 70 year old pole and sawtimber size ponderosa pine. The area was precommercially thinned around 1975, with most residuals showing an increase in radial growth since that time. The current basal area is about 180 sq. ft./A, which is at, or slightly below, that for optimum growth.

A portion of the area was treated by prescribed underburning around 1981. External visible damage to most trees was limited to bark scorch on the uphill side and slight resin bleeding between the bark plates. A few trees exhibited severe damage from adjacent downed logs that ignited during the prescribed burn, and a few small areas experienced total tree mortality following the burn, but these were in the minority. There was no detectable response in radial growth immediately following the prescribed burn. However, trees in the burned area exhibited a decrease in radial growth during 1985 and 1986. There was no visible decrease in radial growth apparent in trees outside the fire line.

A heavy, wet snow in November, 1985 broke the tops of some ponderosa pine at a height of about 20 to 30 feet. In some cases tree mortality spots seemed to be centered around the ponderosa pine stobs that had been attacked by the western pine beetle. The relationship wasn't entirely clearcut, however, because broken trees and mortality spots were not associated in other parts of the stand. The broken tops did not appear to have been utilized by pine engravers, Ips spp., for breeding.

The mortality spots seem to have resulted from a combination of the effects of several unrelated events. Because the mortality and growth loss occurred in the area previously underburned, and not in adjacent areas, it would seem that the

underburning was a contributing factor. The visible tree damage caused by the underburning appeared slight and probably would have resulted in lower losses if precipitation had been less erratic during the last few years. Data from nearby weather stations indicate that the total amount of precipitation received for the water years (Oct.1-Sept.30) 1984 and 1986 were above normal and 1985 was below normal. The precipitation was not well distributed, however, and the percent of normal water content of the snowpack on April 1 (maximum depth) was below normal for all three years. The combination of minor injuries with lower than normal available moisture was apparently enough to make some trees susceptible to the western pine beetle. Some of the stobs created by storm breakage during the fall of 1985 remained alive due to root grafts until the spring or summer of 1986. When these extremely suitable hosts came under attack by the western pine beetle, a pheromone was released that attracted additional beetles to the area. A concentration of western pine beetle in a stand of weakened ponderosa pine resulted in some group kills.

The prognosis for 1987 is for additional mortality. Recently killed trees are common in the general area and there should be an adequate supply of bark beetles to accomodate the weakest trees. Trees in the area previously underburned will enter the 1987 growing season with two previous years of declining radial growth. Radial growth and vigor will probably continue to decline in 1987 because total precipitation and snowpack water content were only about 50 percent of normal by late February.

Unless precipitation is much above normal for the remainder of this spring, there appears to be no practical way to totally prevent mortality in this stand. Because mortality is likely to increase with any type of activity that disturbs the stand, the lowest losses would occur by doing nothing until moisture conditions return to normal and then salvage any commercial mortality.

A second area of concern was a ponderosa pine plantation in Section 12. The planted trees are about 15 years old, 25 feet tall and have reached crown closure. There are a few scattered residuals from the previous mixed conifer stand and there are numerous old stumps throughout the plantation. A strip along the ridge road had been precommercially thinned to an 8-10 foot spacing and pruned as a fuelbreak. The crowns have already closed again in the thinned strip. Radial growth in the thinned strip visibly declined during the last 2-3 years.

A thinned and pruned area south of the ridge road was treated by prescribed underburning about 1984. Along slopes where the fire burned cooly, there was no tree mortality, damage was limited to slight basal charring on the uphill side of the boles and there was no change in the radial growth rate. The fire burned hot enough near the top of the ridge to completely burn out old stumps and kill some trees outright. Other trees injured in the fire are still being attacked and killed by the western pine beetle and red turpentine beetle.

A prescribed underburn was being considered for the plantation area north of the ridge road during 1987. The trees are already under stress, as indicated by a declining growth rate, even in the areas which have been thinned. Stress is likely to increase during 1987 as a result of below normal precipitation. Underburning will cause some degree of injury and add to the stress on the trees. A prescribed burn in this area during 1987 which remains in prescription is likely to lead to at least a few pockets of trees being killed. A burn which

escapes prescription may lead to portions of the plantation becoming seriously understocked.

Management Alternatives

1. Do nothing. Taking no actions during 1987 which disturb the previously underburned mature stand and plantation would involve no direct costs and would probably result in the least tree mortality.

2. Carry out prescribed underburning as planned. Underburning the previously treated mature stand during 1987 should result in additional mortality. The amount of mortality should be at least as large as that seen in 1986, but probably larger. It will tend to occur as groups, which will cause pockets of unstocked land. The results of underburning the plantation in 1987 are less certain, but the most optimistic outlook would be for no change in the current rate of growth or mortality. Other nearby areas with ponderosa pine of similar age and stocking levels have recently had almost complete mortality in areas up to a half acre in size following disturbance by logging or fire.

3. Reprogram resources into hand work. Hand modification of fuels is quite expensive, but it usually causes less stand disturbance than mechanized equipment or prescribed fire. It may be worth the added expense during 1987 when compared with the potential impact on various resources from higher than normal mortality. If green pine slash is created by any type of forest operation during the spring or summer, treatments to make it unsuitable for breeding by pine engravers will lower the risk of subsequent top-killing or mortality in the area.

If you have questions about these alternatives, please call Dave Schultz at 415-556-4322.

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State and Private Forestry